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REVIEWS.

The Steel Workers and Their Labor and Household Problems.

THE STEEL WORKERS.—By John A. Fitch, Fellow, University of Wisconsin, 1908-09; Expert, N. Y. State Dept. of Labor, 1909-10. The Pittsburgh Survey, Findings in Six Volumes; Edited by Paul Underwood Kellogg. New York: Charities Publication Committee, Russell Sage Foundation. Cloth; 6 × 9¼ ins.; pp. 380; 27 illustrations and 10 tables; appendixes. $1.50, net; postage 21 cts. extra.

HOMESTEAD: THE HOUSEHOLDS OF A MILL TOWN. —By Margaret F. Byington, Formerly District Agent, Boston Associated Charities; Ass't Secy., Charity Organization Dept., Russell Sage Foundation. The Pittsburgh Survey, Findings in Six Volumes; Edited by Paul Underwood Kellogg. New York: Charities Publication Committee, Russell Sage Foundation. Cloth; 6 × 9¼ ins.; pp. 292; 58 photographic illustrations and 40 tables in text; appendixes. $1.50, net; postage 20 cts. extra.

These two volumes are complementary, since one of them deals with the steel workers at their daily tasks and in their various relations with their employers, the city and state, their neighbors and families, while the other is chiefly concerned with the households of the men, as affected by their work and wages and by many of the factors set forth in the other book. The volume on the steel workers deals more or less generally with the whole Pittsburg District, while, as its name implies, the other volume is confined to a single and relatively small town. The latter assertion needs to be qualified somewhat, however, since, besides the borough of Homestead, two adjacent and closely associated boroughs are included in Miss Byington's study.

Mr. Fitch introduces his study with an account of the workmen and the steel works; or, in other words, "The Men and the Tools." In this part of his book he gives a general description of the steel industry so far as it is essential to an understanding of the daily tasks of the steel workers, their dangers and the strain upon their strength and health incident to long hours and severe toil in the heat. Parts II. and III. are entitled "The Struggle for Control" and "The Employers in the Saddle." In these sections the breaking down of trade unionism and the establishment of the open shop are described. There are chapters here on "Wages and the Cost of Living," "The Working Day and the Working Week" and "Speeding Up and the Bonus System." In addition, the author discusses "The Labor Policy of Unrestricted Capital" and the "Repression" of the workmen which has resulted from the latter.

Part IV., "The Steel Workers and Democracy," has a chapter on "Citizenship in the Mill Towns" and another on "The Spirit of the Workers."

The last hundred pages are given over to appendixes which in small type present a number of important documents relating to the history of trade unionism in the iron and steel industry; "Unionism at Homestead Since 1892;" statistics of wages; "The Profit-Sharing Plan and Bonus Fund of the United States Steel Corporation," the relief plan of the same Corporation, and the Corporation and Carnegie Pension Fund. Other related topics are also presented in appendixes.

Miss Byington's "Homestead" is essentially a study of the family and the town of one section of the steel workers. The study was made at first hand and gives many vivid pictures of the everyday life of ninety families. The "budgets," or, more correctly, the expense accounts, for four weeks or more of these ninety families were collected by Miss Byington or by an assistant of the same nationality as many of the foreigners among the Homestead population, and were subjected to close analysis from various viewpoints. While the so-called "budgets" are for a brief period the study as a whole extended over a year or so.

To give a further and perhaps a more general idea of the scope of Miss Byington's book, it may be said that its four main parts are as follows: "The Mill and the Town;" "The English-Speaking Households;" "The Slav as a Homesteader" and "The Mill and the Household." Appendixes give statistical and other information in considerable detail, including the actual "budget" figures, classification and earnings of employees, records of casualties on unprotected grade crossings, information on seven-day labor and on cost of living in Pittsburg.

The concluding paragraph of Miss Byington's book presents her findings briefly and forcibly as follows:

> The United States Steel Corporation operates in Homestead one of the largest mills in the country, provided with wonderful machines for producing steel; it has placed in charge a superintendent whose primary object is to produce steel perfectly and cheaply; it offers work on certain terms as to wages and hours which he who wills may accept. Its ignorant Slavic laborers, however, may be exploited by grasping landlords; the wives of many of its workers may find life merely a round of wearisome tasks in the attempt to make both ends meet; its men may be too worn by the stress of the twelve-hour shifts to care for their own individual development or too shorn of self-dependence to exert themselves to maintain a borough government that shall give them better living conditions. "Life, work and happiness" —these three are bound together. The mill offers the one, subject to no effective demand by society or commercial necessity that the work be done under conditions which make the other two possible.

Mr. Fitch does not come to the aid of the reviewer so readily by summarizing his conclusions in a few readily quotable sentences, but in general his conclusions, so far as they deal with the same phases of the subject, are in agreement with those of Miss Byington. He believes that the steel workers are singularly under the domination of the great Corporation which employs them. This is true not only in all that pertains to rates of wages or other working conditions, but also as regards political freedom—local, state and national—and, owing to the twelve-hour day in the seven-day week, even as regards the possibility or at least the practicability of entering into much social enjoyment beyond that afforded by the saloon. This perhaps is putting Mr. Fitch's case rather strongly in some particulars, but on the whole it seems to be as true a representation of his conclusions as can be given in a few words.

It deserves to be said of Miss Byington's book that considering the shades and shadows which she found it is written almost throughout in an optimistic tone, and presents with cheerfulness and force the most that can be found in the way of the brighter side of the life of the Homesteaders.

The two books together or, if one is short of time and more deeply concerned in industrial than in domestic sociology, the one on the steel workers, may well receive the attention of all serious-minded persons, and particularly those who wish to inform themselves regarding the wisdom of attempting to stamp out trade unionism with an iron hand, while at the same time maintaining for thousands of employees the twelve-hour day and the seven-day week.

A Useful Tool for Engineers.

GOOD ENGINEERING LITERATURE.—What to Read and How to Write with Suggestive Information on Allied Topics. By Harwood Frost, M. Am. Soc. M. E., M. Soc. Prom. Eng. Educ.; Author of "The Art of Roadmaking." Published by the Author. Distributing Sales Agents: Chicago Book Co., 226 South La Salle St., Chicago, Ill. Cloth; 5¼ × 7¾ ins.; pp. 422. $1, net.

The author cleverly forestalls the reviewer by saying (p. 352): "The ideal reviewer would be a man of infinitely greater knowledge than the author." We cannot meet this requirement. Mr. Frost shows himself to have very much knowledge, in most or all branches of writing, editing and publishing; and much of this knowledge is such as comes from original reflection rather than from copying others' thoughts. If we now say that his present book is largely a compilation of matter from divers sources, it will be understood that we mean nothing derogatory to the author.

The book deserves a warm welcome from the engineering public. It presents matter needed by every engineer but not available to him hitherto. Witness the following titles, which are the themes of the most important chapters: What to write about; Collecting and arranging material; Preparation of manuscripts for publication; Rights of an author in his works; Copyright; Relations between author and publisher; The Law of libel; Preparation of illustrations for reproduction; The Making of a book.

These subjects refer more specifically to bookmaking than to the production of an article, a paper, or any other short piece of writing. Yet the work can prove as beneficial to the engineer who never wrote or will write a book or a long article as to the most confirmed author. It will be helpful in drawing up specifications, preparing a report, or making written recommendations, in fact in every kind of formal writing that the engineer may have to do. Even the introductory chapters on style, grammar, orthography and punctuation, and choice of words and phrases, will prove instructive to nearly every reader.

While much of the text consists of material previously published in papers, addresses and the like, the author did creditable original work in collecting it and welding it together into a harmonious and complete treatment of a distinct subject. He has produced a useful tool.

NOTES ON PLATE-GIRDER DESIGN.—By Clarence W. Hudson, C. E., M. Am. Soc. C. E.; Professor of Civil Engineering, Polytechnic Institute of Brooklyn, N. Y.; Consulting Engineer. New York: John Wiley & Sons. London: Chapman & Hall, Ltd. Cloth; 6 × 9 ins.; pp. 75; numerous illustrations in text. $1.50, net.

Using a trite phrase, we may say that Mr. Hudson fills a long-felt want with his book on plate-girder design. While the book is small, this is not due to lack of thoroughness so much as to the omission of the many interesting cases of practice which are available for the purpose. Perhaps the first edition may experience enough success to lead the author to expand the work, in a second edition, by including a large number of practical examples.

The several elements of the plate-girder are separately treated in detail: flanges (proportioning and design, with discussion of length of cover-plates and rivet-spacing); web (stresses, thickness, splices); connections; and end details. The treatment combines the didactic and the practical in efficient manner. Turneaure's experiments on web-stresses are not mentioned, but the analytical treatment is fully given. Special web problems, as those occurring in very deep girders connected along the full height of the ends, might warrant further discussion, but this doubtless would have complicated the scheme of the book somewhat. The same remark applies to various special details, which are sometimes required in practice, and to questions of torsional resistance, etc.

Moment and shear analysis is discussed in the last two chapters. A moment table for E-50 loading, the present standard railway loading, is appended.

Copper-Smelting Practice.

Reviewed by JOS. W. RICHARDS,* M. Am. Inst. M. E.

THE PRACTICE OF COPPER SMELTING.—By Edward Dyer Peters, Professor of Metallurgy, Harvard University; Author of "Principles of Copper Smelting," "Modern Copper Smelting." New York and London: McGraw-Hill Book Co. Cloth; 6¼ × 9½ ins.; pp. 693; 121 figures in text. $5, net.

This work is a companion book to Dr. Peters' "Principles of Copper Smelting," and a successor to his older book, "Modern Copper Smelting." The former is a detailed exposition of the chemical, physical and economic principles upon which copper smelting is based, intended particularly for beginners. The latter was written for practical men, to furnish a record and discussion of actual practice; it has gone through many editions, and is now replaced by the present work.

The 18 chapters treat in a most systematic and luminous manner the whole metallurgy of copper by smelting, but not including electrolytic refining. Wet methods, the so-called "hydro-metallurgy of copper," are omitted; they are relatively of small importance, but are not negligible when seeking a complete view of the metallurgy of copper.

The ores of copper are briefly described; the sampling of ores is treated practically and more at length; the chapter reviewing methods of extraction is broadly written, it being incidentally remarked that there is urgent use for a modern handbook on the wet processes, leading one to wish that Dr. Peters could find time to write it for us.

The behavior of copper ores at high temperatures, the principles of roasting and smelting, are clearly and succinctly stated, but in a tone rather more elementary than practical. By this is meant that the writer lays almost as much stress on well known principles as on the less known, and thus gives the impression that he is writing more for mere beginners than for practical men. The treatment lacks light and shade. Pyrite smelting is given a long chapter, and partial pyritic smelting a still longer one. These varieties of smelting, utilizing as far as possible the heat of oxidation of iron and sulphur in the ore, are of rapidly increasing importance, and while Dr. Peters fully appreciates this fact, yet he gives relatively too much space to discussion of their basic principles to harmonize with the title and professed scope of this book. Reverberatory smelting is splendidly handled; this chapter, and the comparison with blast-furnace smelting, is a "work of art." Converting matte to copper and furnace-refining are also well treated. There is a chapter on flue-dust and smoke, one on slags, and one on miscellaneous topics.

Altogether, one could hardly wish for a better book on American copper-smelting practice. Foreign practice is virtually left out, except in connection with pyrite smelting and blast-roasting, and electrolytic refining is not included. Within these limits, Dr. Peters' book is a highly valuable, useful, readable and instructive volume.

THE SPONTANEOUS COMBUSTION OF COAL.—With Special Reference to Bituminous Coals of the Illinois Type. By S. W. Parr, Professor of Applied Chemistry and F. W. Kressmann, Graduate Assistant in Applied Chemistry. Bulletin No. 46, University of Illinois, Engineering Experiment Station. Urbana, Ill.: The University. Paper; 6 × 9 ins.; pp. 87; 21 text figures and 16 tables.

This bulletin is one the expected appearance of which was noted in an article in Engineering News, May 4, on the same subject. The investigations noted in that article are the identical ones described in the article and it is evident that, in effect, the article is a summary of much that is disclosed in detail in this pamphlet. It will be recalled that studies have been made for some time past at the University of Illinois of the factors that enter into the decomposition of coal and the investigations have progressed to the stage where it has been possible to state with some definiteness what leads to spontaneous combustion of coal in storage and what may be done to prevent or check it.

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Harbor Construction and Improvement.

SEEHAFENBAU.—By F. W. Otto Schulze, Professor des Wasserbaues and der Technischen Hochschule in Danzig. Band I.: Allgemeine Anordnung der Seehäfen. Berlin, Germany: Wilhelm Ernst & Sohn. Paper; 7 × 10 ins.; pp. 359; 248 illustrations in text. Geh. 16 marks; Geb. 17 marks; American price, $6.40 and $6.80.

Books on harbor construction and improvement are few enough to make this addition to the list distinctly worth the attention of all who work in this field. While not a complete treatment—the discussion of constructive detail being left to a future volume—yet it can stand by itself because dealing with an integral part of the subject. The author admittedly looked to German practice principally, including only a few of the most important foreign harbors and such as illustrate points not represented among German harbors. Doubtless, however, the local field is covered the more thoroughly for this reason.

It is interesting to learn from the preface that the work sprang from a project to revise and modernize a part of an old work, Hagen's "Handbuch der Wasserkunst," published over thirty years ago. But Prof. Schulze then decided to leave the old work entirely and write an independent book. This accords with the general principle that the attempt to reconstruct an earlier author's obsolescent or wholly antiquated book, however excellent, is rarely if ever advisable.

The present volume may be said to treat of all questions affecting the general plan of harbors. The first two chapters review the history of harbors; discuss the present state of navigation with respect to subject, giving tables of ship dimensions; classify harbor types; and set forth the general requirements. The next two chapters treat of the requirements of special types: naval harbors, refuge harbors, fishery harbors, and commercial harbors, numerous examples being cited and shown by illustrations. Important facts are brought together in Chapter V., on the physical and meteorological phenomena affecting harbors, as, tides, wave phenomena, wind action, currents, etc. The next chapter describes the preliminary examinations, including surveys, soundings, observations of tides, winds, waves, etc., and examination of water and bottom. Somewhat out of natural order, constructive materials are discussed in Chapter VII., with special reference to the action of seawater upon them. The essential subject of the work, finally, is taken up in the last two chapters, of which one deals with the general layout of breakwaters as regards the protection and stability of harbors, and the other with the shape and arrangement of harbor basins.

It will be seen that the scope of the text indicates a satisfactory survey of the subject on the part of the author. The treatment in detail is correspondingly satisfactory. The many map and sketch illustrations are clear in design and well executed.

HYDROMETRISCHE MESSUNGS-VERFAHREN IN DEN VEREINIGTEN STAATEN AMERIKAS.—By Dr.-Ing. Carl Ewald Grunsky. Dresden: Wilhelm und Bertha v. Baensch Stiftung. Paper; 6½ × 9½ ins.; pp. 50; 21 text figures and 9 tables.

This pamphlet is the work of an American engineer, placing before the German public a description of American procedure in stream gaging. The California State Engineer's gagings of the Sacramento and San Joaquin Rivers in 1879 are the basis of the description, and they are used for contrasting float measurement with current-meter measurement, and for bringing out numerous peculiar points about stream-gaging work and velocity curves. Current-meter rating, operative peculiarities of meters, and the present methods of gaging of the Geological Survey are discussed. The author suggests an improved current-meter and recommends computing mean velocity from surface velocity after precise determination of their ratio for different forms of cross-section, for which he gives a tentative curve.

FORSCHERARBEITEN AUF DEM GEBIET DES BETONS.—Heft XIV. Eine Güteprobe für Eisenbeton System Dr. v. Emperger. By Gerhard Neumann, Ingenieur im Spezialbureau für Eisenbeton Dr. von Emperger. Second enlarged edition. Berlin: Wilhelm Ernst & Sohn. Paper; 7¼ × 10 ins.; pp. 31; nine text illustrations. 4 marks; American price, $1.60, net.

For some time past Mr. F. von Emperger has argued actively against the sufficiency of the compression test of concrete for inspection of quality in the erection of forced-concrete structures. He has proposed, as an improvement, that special test-beams, of the same form, standard size be molded at the same time as the part of the structure in question, and that these be left to set under the same exposure as the actual structure, and that they be tested to rupture at a chosen period. By reinforcing these test beams so heavily that compression failure is ensured, he claims that the rupture load will give a highly reliable measure of the developed strength of the concrete.

If the specification for the structure is drawn so as to call for a given minimum strength, instead of prescribing mixture ratios and character of sand and stone, the test-beams will constitute the inspection and acceptance test. At the same time they afford a means for fixing the time at which centering may be removed. As the test-beams will acquire strength just as rapidly or as slowly as the main structure. These arguments, and other matter on the Emperger beam-test, are set forth by one of his associates, Mr. G. Neumann, in the above pamphlet. The recommended size of test-beam is: 7 cm. (2¾ ins.) wide, 8 cm. (3.15 ins.) deep to center of reinforcement, 2 m. (6.56 ft.) span, and preferably 4% reinforcement consisting of two 12-mm. (0.47-in.) round bars with hook-end anchorage at the upturned ends. The novelty of the proposal, and its merits as well, make the pamphlet worth the attention of American concrete workers.

LEHRBUCH DES MASCHINENBAUES.—Herausgegeben von Karl Esselborn. Erster Band: Materialienkunde. Festigkeitslehre. Maschinenzeichnen. Maschinenelemente. Kolbenmaschinen. Windmotoren und Kreiselmaschinen. Dampfkessel und Gasgeneratoren. Bearbeitet von den Professoren L. Klein und Dr.-Ing. A. Nachtweh, sowie Diplom-Ingenieur J. Maercks. Leipzig: Wilhelm Engelmann. Paper; 7½ × 11 ins.; pp. 22; 802 text figures. Geh. 20 marks; geb 22, net; American price, $8 and $8.80 net.

The work of which this is the first volume is intended to present the main elements of machine design, both descriptively and by rule and formula. It covers materials, applied mechanics, mechanical drawing, machine parts, steam and gas engines, wind-mills, steam turbines, centrifugal pumps and fans, boilers and gas-generators—a wide range. Its most unusual feature is the ample chapter on wind-mills, which subject is thoroughly neglected in American works. The future second volume will deal with electrical machinery, contractors' machinery and cranes, hydraulic machinery, and machine tools. While apparently intended to furnish to the designer the entire mental equipment he needs, the work will need to be supplemented by detailed study of the separate subjects covered. It is chiefly a students' text, of rather compendious character.

WERNER VON SIEMENS: EIN BAHNBRECHER IN DER WISSENSCHAFT, TECHNIK UND ETHIK.—Ein Volksabend. By Ottomar Beta. Gotha, Germany: Friedrich Emil Perthes. Paper; 6 × 9¼ ins.; pp. 42. 1 mark; American price, 40 cts.

Biographical sketches of great engineers are among the most valuable elements of our literature. The present sketch of the greatest of the Siemens, while perhaps a popular rather than a technical piece of writing, affords the American reader the advantage of getting the home view of this active pioneer. The pamphlet is well worth reading.

EINFUEHRUNG IN DIE RATIONELLE METHODE DER BEOBACHTUNG IM FLUSSBAU.—Zur Förderung des Flussbaues und seines Unterrichtes für Ingenieure und Studierende. By Ing. C. Krischan. Graz, Austria: Druck und Verlag "Leykam." Paper; 6¾ × 9½ ins.; pp. 68; one folding plate.

An introductory pamphlet to a future larger work. Analysis of stream-gagings in stable channels is recommended as a means of deducing the laws to which river-regulation works must conform if stability is to be ensured.

Management of Central-Heating Systems.

Rev by WM. PAUL GERHARD,* M. Am. Soc. M. E.

WIR HAFTLICHKEIT DER ZENTRALHEIZUNG—ge Bemessung, Ausfuhrung und sparsamer Bet- By Dipl.-Ing. G. De Grahl, Zehlendorf-West bei n. Munich and Berlin: R. Oldenbourg. Cloth; 9½ ins.; pp. 198; 96 illustrations in text and tables. 6 marks; American price, $2.40, net.

N long ago the writer reviewed in these columns three new German textbooks on heating and ventilation, which were published almost at the same time. (See this Supplement for Oct. 14 1909.) The book now before us is not intended as a general textbook on these subjects. There is little in it regarding ventilation of buildings and as to heating, the endeavor of the author is largely confined to offering in a permanent form a number of original heating data, which he bases upon the practical experiences collected by him in the course of eight years' service as a heating expert in court litigations.

The real purpose of the book is to be a guide in the economical management of central-heating systems; but incidentally it contains much valuable advice on the subject of fuel consumption.

The author begins by pointing out that our knowledge of the operation of central-heating plants is still quite imperfect, and that the data heretofore used in figuring the efficiency of heating boilers are neither always suitable nor always correct. He also, and perhaps justly, claims that while most contracts for the installation of heating apparatus contain some clauses or conditions referring to the expected efficiency of the plant, it is in most cases difficult, if not impossible, to give theoretical proofs of such efficiency, and that the only true method of procedure consists in instituting a series of practical heating tests, which should be in charge of unbiased heating engineers of experience and good standing.

Economies in the heating of large buildings may only be effected by reducing the numerous heat losses which occur in every-day practice. To show what these heat losses are, where they occur, and what they amount to, the author follows the combustion of the fuel from the boiler grate to the chimney flue; he also traces the heat losses in steam or hot-water pipe distributing systems. His special investigations enable him to assert that the efficiency of many commercial forms of heating boilers are considerably overrated, sometimes as much as 50%.

His experiments and the deductions made therefrom appear to be limited largely to central hot-water heating systems, and moreover in nearly every instance the fuel mentioned as having been used is gas coke, which in Germany is a favorite, because comparatively cheap, fuel. These two facts, combined with the further fact that the boilers tested were special forms of heating boilers not in general use in the United States, give to the book a theoretical rather than a practical value as far as American readers are concerned, and decidedly limit its usefulness.

There are in all 27 chapters, of which, the ten longest give elaborate accounts of practical efficiency tests of some forms of heating boilers. Other chapters contain discussions of the conditions influencing the amount of fuel consumption, explain some formulas used in determining a priori the expected consumption of fuel in boilers; bring some data on average outdoor temperatures; treat of the loss of heat in pipe distribution systems, of the relative values of different kinds of commercial coke, and of the methods adopted in the past by leading manufacturers of heating boilers to determine boiler efficiencies.

The question at what average outdoor temperature the owners of apartment-houses should begin to provide heat for their tenants, which forms the subject of one of the shorter chapters, has apparently been a bone of contention as much in Germany as it has been here in recent winters; it probably was the subject of some court proceedings in which the author of the book acted as heating expert to the court.

The practice which seems to be still a common one in Germany of interrupting the heating of large buildings during short periods of milder weather led the author to devote special chapters to the consideration of the heat losses occurring in outer walls, and to give quite a lengthy discussion of the comparative merits of continuous and intermittent heating.

While the book brings much that is of considerable interest, it would not, taken as a whole, be of special value to American heating engineers, because the methods in universal vogue here are so different and also because of the limitations of the book mentioned heretofore. That in Germany it will prove useful in leading to more economical methods in the management of central heating plants the reviewer does not doubt.

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RAILROAD TRAFFIC AND RATES.—By Emory R. Johnson, Ph. D., Professor of Transportation and Commerce, University of Pennsylvania. Author of "American Railway Transportation," and Grover G. Huebner, Ph. D., Instructor in Transportation and Commerce, University of Pennsylvania. In two volumes. Vol. I.: The Freight Service; Vol. II.: Passenger, Express and Mail Service. New York and London: D. Appleton & Co. Cloth; 5½ x 8½ ins.; pp. 972; many forms, maps and charts. $5 per set, net.

These volumes are a very valuable contribution to the literature of railway operation. In them are described in detail the work carried on by the Traffic Departments of American railways. Due attention is given to the historical side of the subject and it is valuable to have recorded the various evolutionary stages through which this branch of railway operation has passed.

The book is in no sense controversial. It deals with many subjects which have been and still are a matter of fierce contention, but the authors deal with them in an impartial way and their comments appear invariably to be judicial in tone and calculated to aid the reader to gain a full view of the situation. The first volume is devoted to freight traffic and rates and the second to passenger traffic and rates.

In the compilation of the book the authors have had the active assistance and criticism of many railway officers and the statements contained may be taken as an authoritative statement of present day practice. The field which the treatise covers is so broad that the limited space which can be afforded for each branch of work does not permit exhaustive treatment; but a bibliography attached to each chapter with copious footnotes guides the reader interested in a particular subject to further sources of information.

The second section of the first volume, devoted to freight rates is particularly timely when the matter of equitable freight rates and the control of rates by the state are being widely discussed.

DICTIONARY OF ENGLISH AND SPANISH TECHNICAL AND COMMERCIAL TERMS used Principally in the Iron, Steel, Hardware and Engineering Trades. By William Jackson. London: E. & F. N. Spon, Ltd. New York: Spon & Chamberlain. Cloth; 4 x 6¾ ins.; pp. 164. $1, net.

It is a pleasure to see a gradual increase in the small list of technological translating dictionaries. The present accession is unpretentious, but it can prove of great value to many persons who deal with Spanish-American countries. The author's aim was to cover the terms relating to iron and steel material, supplies, tools and machinery. Commercial terms, words used in correspondence, etc., are also included. He has compiled a very fair vocabulary, and while the equivalents are often given in unduly brief form yet the chief demands of the user are met.

THE PUBLIC HEALTH MOVEMENT.—The Annals of the American Academy of Political and Social Science. Issued bi-monthly. Vol. XXXVI., No. 2. Emory R. Johnson, Editor. Philadelphia, Pa.: The Academy. London: P. S. King & Son. Paper; 7¼ x 10 ins.; pp. 334. $6 per year; $1 per copy.

A valuable symposium is here presented in three parts: (1) The General Problem; (2) Disease Carriers—The Control of Causes; (3) Elimination of Diseases—Physical Care of Individuals. Altogether, 24 writers, many of them eminent authorities in their respective fields, contributed to this symposium. Among the papers we note "Scientific Research by the Public Health Service," by Dr. J. W. Kerr, of the U. S. Public Health and Marine-Hospital Service, Washington, D. C.; "The Census and the Public Health Movement," by Cressy L. Wilbur, Chief Statistician of Vital Statistics, Bureau of the Census, Washington, D. C.; "Protecting Public Health in Pennsylvania," by Dr. Samuel G. Dixon, Commissioner of Health, Pennsylvania; papers on rural health problems, by Messrs. Charles Wardell Stiles and Charles E. North, of Washington, D. C., and New York City, respectively; "The Mosquito Campaign as a Sanitary Measure," by John B. Smith, State Entomologist of New Jersey; "Ventilation and Public Health," by D. D. Kimball, of Richard D. Kimball Co., New York. Papers on many other phases of public-health work and of hygiene and sanitation are included.

Where so much good matter has been presented, one hesitates to point out omissions or inadequate treatment, but we cannot refrain from saying that the value of this symposium would have been increased had there been a paper each on (1) the work of state and (2) city boards of health; (3) on water-supply and (4) on sewage disposal. All these subjects are touched upon, but in a more or less incidental way. There is a paper on state health work in Pennsylvania, and state health work on the Pacific Coast is discussed in one of the other papers, but nowhere is there presented a well-rounded consideration of the work of state and city boards of health.

LE CONSTRUCTEUR DE CERFS-VOLANTS. Plans grandeur d'exécution et indications pour construire Quatre Cerfs-Volants. First series. Cerfs-Volants Simples. Paris: Librairie Aéronautique (32, rue Madame). Paper, 7½ x 9½ ins.; pp. 24; two folding plates (plans); 26 text figures. 1.50 francs. American price, 30 cts., net.

The title of this booklet, being translated, reads "The Kite Builder. Half-size Plans and Instructions How to Build Four Kites." The book consists of drawings and instructions for the making of rudimentary forms of kites, remarkably similar to those that are now being put together in thousands of American backyards. But the language of the instructions is very scientific, or perhaps we should say is serious in tone, as the following translation will show:

> To launch a kite it is necessary to choose, where possible, an open space where from 40 to 50 meters of cord may be unrolled and where there is clear level ground to the windward. We would suggest that the flyer have an assistant who will hold the kite stretched out horizontally on the ground so that the wind cannot catch it. The tail should be spread out on the ground in front into the wind. * * * The cord will then be unrolled, the reel being tightly held and at a signal from the flyer the assistant will lift the kite little by little with its plane sloping up into the wind. Generally the kite will lift itself but if the wind is insufficient the operator should help it out by running. Some kind of a vehicle, a carriage, automobile or bicycle, establishes an atmospheric reaction rendering the same service.

This makes ordinary kite-flying seem like a formidable undertaking, instead of a sport which American boys, at least, generally master somewhere between six and twelve years of age—varying with the boy and his opportunities.

THE AUSTIN DAM.—By T. U. Taylor, M. C. E., Professor of Civil Engineering, University of Texas. Austin, Tex.: University of Texas, Bulletin No. 164. Dec. 22, 1910. Paper; 6 x 9 ins.; pp. 85; illustrated.

A year ago the city of Austin, Tex., contracted for rebuilding the unfortunate Austin Dam (see Eng. News, April 14, 1910). The contract expired a few months ago and subsequently was declared forfeited. The city thus has its hands free again. Prof. T. U. Taylor, who has been active in collecting and recording the hydrology of the Texas Colorado and the history of the dam, now publishes a revised summary of this history in a Bulletin of the University of Texas. While largely made up from Water Supply Paper 40 of the U. S. Geological Survey (out of print), it contains enough new matter to entitle it to a place in the file of every engineer interested in dam construction.

Dr. Charles B. Dudley.

THE LIFE AND LIFE-WORK OF CHARLES BENJAMIN DUDLEY, PH. D.—Late President of the International Association for Testing Materials and of the American Society for Testing Materials. Memorial Volume. Philadelphia, Pa.: American Society for Testing Materials (Edgar Marburg, Secy.). Cloth; 6¼ × 9¾ ins.; pp. 269; three plates. $2.50 cloth; $3 half leather.

It is a particularly fitting thing that the late Dr. Charles B. Dudley should be honored by a memorial volume from the hands of the American Society for Testing Materials; not so much because that society was Dr. Dudley's sole interest, for there has probably been no man in the field of applied science with so wide and varied a field of endeavor, but because for at least five years before his death no one could consider the Society without considering Dr. Dudley. Under his able guidance for ten years prior to his death in December, 1909, the Society reached international prominence, and none of the executives who assisted him in his labors will deny that it was to his skillful but withal practical mind that its present honorable estate is mostly due.

The memorial before us has a double value: it serves to collect into one volume the biography of a man whose life has been known mainly by his works and it also brings together those presidential addresses before the American Society for Testing Materials, which, taken together, form the best exposition yet published of the science of testing materials and its allied art, the writing of specifications.

The biographical portion contains a sketch by Prof. Edgar Marburg, a short notice by a fellow-worker in the laboratory of the Pennsylvania Railroad, and a report of the proceedings of the memorial session of the American Society for Testing Materials held at Atlantic City last summer. Added to this are many notices from the press and from society resolutions, together with considerable statistical data setting forth the great number of societies to which Dr. Dudley belonged, the honor which was won and the articles which he wrote. Finally, there are the five presidential addresses and three somewhat related addresses delivered at different occasions. It is a worthy work worthily done.

PROCEEDINGS OF THE BARGE CANAL TERMINAL COMMISSION OF THE STATE OF NEW YORK.—Vols. I. and II., 1911. Frank M. Williams, Chairman; Frederick C. Stevens, Edward A. Bond, Harvey J. Donaldson, Alexander R. Smith, Secretary; Charles Klehm, Engineer. Albany, N. Y.: State Doc. Cloth; 5¾ × 9 ins.; pp. 1,158; 30 maps and 5 text illustrations.

The report of this Commission is in two volumes, the first embodying the report proper as Part I., and the results of a foreign tour of the Commission as Part II., and the second containing a stenographic report of the various hearings in the cities affected by the canal. Since it is admitted that the economy of a waterway is dependent upon the design of its terminals, a report, like this one, of a body of experts assigned specifically to the study of the waterway terminal question has a certain and pronounced place in the literature of inland waterways.

MECHANISM.—By S. Dunkerley, D. Sc., M. Inst. C. E., M. Inst. M. E.; formerly Professor of Engineering and Director of the Whitworth Laboratory in the University of Manchester. Third edition. Edited by Arthur Morley, M. Sc., M. Inst. M. E.; Professor of Mechanical Engineering in Universiy College. Nottingham. New York and London: Longmans, Green & Co. Cloth; 5½ × 8¾ ins.; pp. 448; 451 illustrations in text. $3, net.

Only the kinematics of machines is dealt with in this book, which is not intended to cover the design of machine parts. It considers only the means of obtaining various definite movements of machine parts, without regard to the question of strength necessary to transmit the force required.

The first edition of this work was reviewed in these columns in the issue of April 13, 1905, by Mr. G. R. Henderson, M. Am. Soc. M. E., who classified it is as "an interesting addition to a branch of study that has been quite largely written up heretofore." In the present edition, which does not appear to differ materially from the second, the first eight chapters remain the same as in the first edition except for minor verbal alterations. A ninth chapter has been added, however, which is somewhat in the nature of an appendix. It describes and discusses some special kinematic chains of particular interest and includes discussions of freedom and constraint of a point and of a rigid body, geometrical slides and clamps, Sarrut's parallel motion, the Amsler planimeter and a novel mechanism in which one shaft drives another whose axis is at right angles to it through a plain connecting rod and two cranks. There is also a description of a universal milling machine, which seems somehow strangely out of place, and a treatise on worm gearing abstracted from the "Proceedings" of the Institution of Mechanical Engineers.

HISTORY OF BRIDGE ENGINEERING.—By Henry Grattan Tyrrell, C. E., Bridge and Structural Engineer; Author of "Mill Building Construction," "Concrete Bridges and Culverts," "Mill Buildings," etc. Evanston, Ill.: The Author. Cloth; 6 × 9¼ ins.; pp. 479; 328 text illustrations. $4, net.

Engineering has so marvelously developed in the past half century that engineers are apt to forget that it has a history and that the fundamentals of the art were well grounded many ages ago, before the men who were practicing it had arrived at the dignity of being called engineers. The practical effect of such forgetfulness upon the modern practitioner is quite small; it is possible, in fact, that a successful engineer need not know that structures existed before the 19th century, but for his own satisfaction and for the love of his work which each honest worker should have, the efforts of his predecessors should surely be a part of his knowledge. For that reason, any history of any phase of engineering ought to be welcome to the profession.

Mr. Tyrrell's book, noted above, falls short of what such a history should be. It is a mere chronicle or descriptive list of a great number of bridges, classified into chapters according to their general type, and accompanied by outline elevations or half-tone views of the more important. As a catalog it is acceptable but there is little of the history in it. Possibly it is too much to expect, but it seems to us that an ideal history of this sort should show the gradual development of the art, the inter-relation of the various types, and the effect of the various materials upon those types.

As a mere item of book making, it would have added a great deal to the workability of the book had descriptive captions been added to the mere figure numbers accompanying each cut.

LANDSCAPE GARDENING.—How to Lay Out a Garden. By Edward Kemp, Landscape Gardener. Edited, revised and adapted to North America by F. A. Waugh, Professor of Landscape Gardening, Massachusetts Agricultural College. Fourth edition. New York: John Wiley & Sons. London: Chapman & Hall, Ltd. Cloth; 5 × 7½ ins.; pp. 292; 20 plates and 79 illustrations in text. $1.50, net.

Sixty years ago Edward Kemp wrote a little book entitled "How to Lay Out a Small Garden." The volume went through several British and American editions, and was finally enlarged and given the more dignified title "Landscape Gardening." Recently the American publishers induced Prof. Waugh to revise the book, with the idea of bringing it more into line with the ideas of the present day and also of eliminating material of purely British application. Prof. Waugh seems to have accomplished his task in as satisfactory a manner as could have been expected, bearing in mind the difficulty always presented in attempting to bring an old treatise up to date—a task which is both easier and harder when a revision is made by another author.

The book as it now stands is a straightforward exposition of the essential principles of landscape gardening, well within the grasp of any intelligent person, and written in a pleasing style. The volume contains comparatively little on the selection of planting material or on the many operations preparatory to getting ready to plant.

Apparently, most, if not all, of the original engravings and text have been retained and, in addition, there have been inserted 21 half-tone engravings on inset plates. These engravings are from photographs of American scenery: some natural, but mostly from the work of our best landscape architects. The index is ... briefly, comprising only some 160 entries ... ing such catch words as "originality ... doing," and various accessories.

WIDER USE OF THE SCHOOL PLANT.—By Arthur Perry. Introduction by Luther ... lick, M. D. New York: Charities Publi... mittee (Russell Sage Foundation). Cloth; ... ins.; pp. 423; numerous photographic ... $1.25, postpaid.

Until recently most of the immense in... in public school buildings throughout ... try was utilized only some five or six ... day through half the days in a year. ... save this economic waste, but more la... cause of the desire to extend education... ice along new lines and to combine ... recreational and social activities, there ha... established in many of our cities night ... vacation schools. In addition, the school ... have been thrown open for the use of cl... and less permanently organized meetings ... tures. The object of this book is to ... what has been accomplished along the... lines and give some idea of the methods emp... in the resulting cost and service rendered. ... sides night and vacation schools, descriptions ... are given of playgrounds, public lectures and ... tertainments, recreation and social center ... athletic and allied activities and occasional ... meetings in schoolhouses. References are ... made to night schools abroad, as well as in this country. Appendices give local lecture sources and also the regulations covering the use of school buildings at Rochester, N. Y., for other than conventional school purposes. Well-chosen illustrations show many examples of the "wider use of the school plant." The book is a valuable addition to the growing list of publications of the Russell Sage Foundation.

THE FIRE RESISTANCE OF FLOORS.—Being Tabulated Results of Fire Tests conducted by the Committee [mentioned just below]. Compiled by Edwin O. Sachs, Architect, Chairman, British Fire Prevention Committee, and Ellis Marsland, District Surveyor, Gen. Hon. Sec., British Fire Prevention Committee. London: The British Fire Prevention Committee (8 Waterloo Place, Pall Mall). Boards; 8½ × 11 ins.; pp. 12; three illustrations. 2ls., net; American price, $8.40, net.

For the past 12 years the British Fire Prevention Committee has been making large-size fire tests on various types and varieties of fire-resisting constructions and material and has, from time to time, issued so-called "red-books," reports showing the results of these tests. It now has decided that sufficient time has elapsed to collect some of these data into one report covering each of the separate subjects. The first of these summaries is the one noted above. This gives in tabular form the results of all tests made by the committee on fireproof floors, dividing those floors into three classes, floors affording, respectively, full protection, partial protection and temporary protection. This makes a very useful compilation of needed experimental data.

AMERICAN TELEPHONE & TELEGRAPH COMPANY.—Annual Report of the Directors to the Stockholders, 1910. (Charles Eustis Hubbard, Secy.) New York: The Company. Paper; 5½ × 8½ ins.; pp. 68; illustrated.

This is one of those few primarily financial reports which show much of popular and of engineering interest about a great public service. There are the usual summaries of business done, equipment owned and new plant put in use; but there is more than that here for the company's policy in respect to depreciation, associated companies, independent companies, public relations, government regulation, etc., is set forth at some length. The company's argument for its complete control, as a beneficient monopoly, of the entire telephone (and telegraph?) service of the country deserves a wide circulation.

A paper of some 50 pages on "The Essential Features of the Geology of the Philippine Islands" makes up the larger part of the "Philippine Journal of Science" (Manila, P. I.) for November, 1910, which has just come to hand. The paper is by Mr. Warren D. Smith, and is illustrated by a number of handsome engravings, mostly reproductions of photographs.

Modern Framed Structures Revised: Part II.

THEORY AND PRACTICE OF MODERN FRAMED STRUCTURES.—Designed for the Use of Schools and for Engineers in Professional Practice. By the late J. B. Johnson, C. E.; C. W. Bryan, C. E., Manager of the American Bridge Co., and F. E. Turneaure, C. E., Dean of the College of Mechanics and Engineering, University of Wisconsin. In three parts. Part II.: Statically Indeterminate Structures and Secondary Stresses. Ninth edition, rewritten. New York: John Wiley & Sons, London: Chapman & Hall, Ltd. Cloth; 5¾ × 9¼ ins.; pp. 538; 55 illustrations in text. $4, net.

The revision of Johnson, Bryan and Turneaure's standard work on bridges has affected in particularly marked manner the portions segregated from the old single volume in the present Part II. The book covers (1) stress analysis in bridges other than simple (generally, cantilever bridges and statically indeterminate structures), and (2) analysis of secondary stresses. The former subject was treated in the old editions in sufficiently detailed manner to satisfy most needs of practice. But practice to-day and the needs of the immediate future call for much more exhaustive analysis, and at the same time demand a useful statement of the analysis of secondary stresses. Accordingly, we find the book essentially a new work, though closely similar to the original work in its simple, straightforward style of explanation and analysis.

The most important departures are exhibited by the chapters on Suspension Bridges and on Secondary Stresses, which together make up nearly half the book. Both are certain to find extensive study and practical use, in spite of their mathematical nature. Secondary stresses promise to play a far more prominent part in bridge analysis than heretofore. But as their study is quite intricate, the exhaustive treatment here presented might well have been published in separate form, particularly because the methods employed are not closely related to those used in statically indeterminate analysis.

While the two chapters mentioned are the most notable, yet thoroughgoing change characterizes also the chapters on continuous girders, swing-bridges and arches. Less novelty is noted in the treatment of cantilever bridges, though the form of the matter is much changed. A rather more extensive use of graphical diagrams in the course of the analysis seems to be a feature of all these chapters, and influence lines appear far more frequently than in the original work.

To discuss detail points of the contents of the volume is hardly feasible without going beyond our due limits. Nor is it necessary, inasmuch as the general statement that the excellence of the original work is fully maintained in up-to-date form will suffice to recommend the present book to all bridge engineers and students of the subject.

THE ANSCHUETZ GYRO COMPASS.—History, Description, Theory, [and] Practical Use. Kiel, Germany: Anschuetz & Co. Cloth; 6¼ × 10 ins.; pp. 109; 45 figures in text.

The novelty of the subject and the non-commercial style of treatment remove this book somewhat out of the trade-publication class. It is an English book, worked over from a German edition with numerous additions, it is stated. The action of the Anschütz gyrostatic compass, its active principles, the formulas applicable to it, and the construction of the commercial device, are treated in full outline. The style is clear.

MECHANICS FOR ENGINEERS.—A Text-Book of Intermediate Standard. By Arthur Morley, M. Sc., M. Inst. M. E.; Professor of Mechanical Engineering in University College, Nottingham. Third edition. New York and London: Longmans, Green & Co. Cloth; 5 × 7½ ins.; pp. 290; 200 illustrations in text; appendix. $1.20, net.

There is already in the market a considerable number of satisfactory text-books on simple mechanics, including in this term not only pure mechanics but also the elements of mechanics applied to machines. The present text adds a useful book to those already in the field. It is useful because clearly written, well illustrated with varied examples of practical value, and planned with proper regard to the logical development of the subject. Calculus methods are not used in the book, which of course limits its range.

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Electric Cranes.

ELECTRIC CRANE CONSTRUCTION.—By Claude W. Hill, Assoc. M. Inst. C. E.; M. Inst. E. E.; M. Inst. M. E. London: Charles Griffin & Co., Ltd. Philadelphia, Pa.: J. B. Lippincott. Cloth; 6¼ × 9 ins.; pp. 313; 337 text illustrations and 23 tables. $8. net.

There are few books in the English language on hoisting and conveying machinery. The industry concerned is large, and it engages not only skill in designing, but also much of both theoretical knowledge and experience. It affords therefore much room for books recording the science and practice of the art. Yet so little has been written that Mr. Hill's book on electric cranes is something of a pioneer work. The book bears the impress of wide experience and thorough familiarity with the subject, is fairly comprehensive in scope and is written with care and ability; its place in technical literature is therefore assured.

A selected range of crane and hoist types is treated descriptively—overhead traveling or bridge cranes and gantry cranes, locomotive cranes, stiff-leg derricks, and the related sheer legs, revolving cantilever or tower cranes, limited-travel hoisting trolleys of the Temperley type, and cableways. It will be recognized that the range of cranes is by no means exhausted hereby. Without specifying the omissions in this respect, we may point out also that the ordinary guy derrick and such useful devices as gin-poles are not covered, and that the restriction to electrically-operated machines not only makes the description of locomotive cranes rather non-typical but also robs the book of a discussion of the commonest and therefore most important lifting machine, the steam hoisting-engine or steam winch. Considering in connection herewith that the specialized field of coal-hoist and unloader practice is not covered, it is evident that there is room for much more crane literature.

But it is further to be noted that the book in treating of details gives virtually nothing on hooks, sheaves, tackle details, buckets, and other important auxiliaries, while two details are very elaborately discussed, namely gears and brakes, of which the former is wholly and the latter in large part independent of the electric operation feature. The conclusion is to be drawn, then, that the book represents by no means an exhaustive treatise, either on hoists and cranes generally or on electric cranes, but is limited to certain important types of crane and hoist, and certain crane details and auxiliaries. However, within its limits (as defined by the actual contents of the book rather than by the proper scope of the subject) the book is gratifyingly thorough. The inclusion of many large-scale drawings of cranes actually built makes the work also a valuable representation of first-class British practice in its field.

We have mentioned, above, the types of hoisting machine which are described. This matter occupies only one-fourth of the text, however. The other and larger part of the work may be divided into three subjects: Structural design, Machinery (including motor and controller), and Details.

As to the first of these (Chap. X.), more than half of the space devoted to it is occupied by a discussion of column strength. The rest considers chiefly truss and plate-girder design, and frame analysis. Apparently the practice as to allowable stresses, etc., is not different from that of the bridge designer. This being so, it is probable that no engineer concerned with crane design will need to refer to this chapter to learn of stress analysis or design. Column strength also is a matter not more pertinent to electric crane construction than to bridge or building work. The engineer who does not accept the author's preference for the Lilly formulas generally, will not be inclined to use them in crane design merely because they are specially advocated in this book. The chapter as a whole, being a part of general bridge and structural teaching, might have given place to more exclusively crane matter.

Machinery is treated rather differently. In Chap. VIII. and IX., required power and torque are discussed. These of course are vital data in the design; the treatment is especially useful because the figures given are largely from practical experience. Chap. XVI. on Motors, explains the relations between heating and load-factor, mainly with regard to tests of motors; it is supplemented by an explanation of controller circuits in Chap. XVII., which ends the electrical part of the subject. Conductor wires, trolley-wheels and other electrical matters are not specially discussed. The mechanical part of crane machinery is covered in 17 pages, dealing with design of shafts and bearings, roller rings for revolving cranes, and wheels; values for pressures, etc., are given from the author's experience.

While brakes and gears are part of the machinery, they receive separate, very full, treatment. Gearing is by no means peculiar to cranes, nor is its use in cranes its most important or most common application. Therefore the chap-

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...Toothed Gearing is not really in place here; but it is so clear and careful an exposition of its theme as to merit the reader's appreciation even though out of its proper surroundings. Brakes, on the other hand, is by all means appropriate to the book, since the brakes are in certain respects the vital elements of a crane. The treatment is good, even though not of comprehensive scope; numerous good drawings are given.

Details or auxiliaries are relegated to Chap. XIV, entitled Hooks, Lifting Magnets, Ropes and Chains. The chapter is only 10 pages long, and it is fully characterized by noting that hooks are disposed of by two cuts and a page of text, nothing even to give a correct formula for proportioning the cross-section. The subject of lifting magnets is amplified in a separate chapter on design of magnets (10 pp.). Sheaves, buckets, grabs, and the other numerous details essential to crane work are left out of account. If we add that a closing chapter (Crane Installations) gives some descriptions, tells of the use of hydraulic cranes driven by electric pumps with auxiliary accumulators, and shows an electric capstan, we have briefly summarized the book for the reader's guidance. We repeat our former remark, that the range of the work as defined by its principal chapters is covered in an excellent way, well suited to all engineering needs.

ELEMENTS OF DESCRIPTIVE GEOMETRY.—With Applications to Spherical and Isometric Projections, Shades and Shadows, and Perspective. By Albert E. Church, LL. D., Late Professor of Mathematic in the U. S. Military Academy, and George M. Bartlett, M. A., Instructor in Descriptive Geometry and Mechanism in the University of Michigan. New York, Cincinnati and Chicago: American Book Co. Cloth; 5⅜ × 8½ ins.; pp. 286; 143 illustrations in text. $2.25, net.

Church's "Elements of Descriptive Geometry," originally published in 1864, is known to many practicing engineers through personal contact in their undergraduate days. It will be remembered that the figures or diagrams were published in a separate volume of rather inconvenient size. Mr. Bartlett has included the figures and text in one convenient volume. Some readers, however, may sigh for the old arrangement while turning back and forth from the text on one side of a sheet to the corresponding figure on the other side. The figures have all been redrawn and many of them improved, and pictorial views have been introduced to elucidate several of the more difficult elementary problems.

While much of Prof. Church's text has been retained, there is some alteration or rearrangement and considerable addition of new material. In the changes made, preference has been given to general cases rather than special ones. In the treatment of curved surfaces, single curved surfaces are taken up first and followed by warped surfaces and surfaces of revolution. The added material includes a number of new problems and exercises, and an explanation of the use of the "profile plane" of projection. Enough problems are solved in the "third angle" to familiarize the student with its use. In general, the additions made are such as to fit the book for use as a guide in drafting-room work on intersections and developments as well as a text book for class room work and study.

The volume is divided into five parts on orthographic projections, spherical projections, shades and shadows, linear perspective and isometric drawing, respectively.

A SHORT HAND-BOOK OF OIL ANALYSIS.—By Augustus H. Gill, S. B., Ph. D., Professor of Technical Analysis at the Mass. Inst. of Tech., Boston, Mass.; Author of "Gas and Fuel Analysis for Engineers," "Engine Room Chemistry." Sixth edition, revised and enlarged. Philadelphia and London: J. B. Lippincott Co. Cloth; 5¼ × 8¼ ins.; pp. 188; seven text figures; appendix (16 tables). $2, net.

Prof. Gill's "short handbook" seems to continue in popularity, as only two years ago the fifth edition came out and now we have here the sixth. The first edition appeared in 1897. We have previously noted (Eng. Lit. Sup., May 13, 1907) that its usefulness to engineers seemed to depend, in large measure, on its simple presentation of physical and chemical tests for various oils so that it could be used without

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MONOPLANES AND BIPLANES: THEIR DESIGN, CONSTRUCTION AND OPERATION.—The Application of Aerodynamic Theory with a Complete Description and Comparison of the Notable Types. By Grover Cleveland Loening, B. Sc., A. M. New York: Munn & Co., Inc. Cloth; 6 x 8¼ ins.; pp. 331; 278 illustrations in text. $2.50, net.

There must be an omnivorous army of readers clamoring for books on the "conquest of the air" or else no publisher feels that the perfect book on this subject has been published except his latest one. In no other way can one account for the surprising increase in the number of these books appearing in all sizes from the tiny pocket volume to the ponderous tome not easily held in the lap. The book under review falls into a middle class—not very large nor yet small, not strictly technical, but yet enough so that the mass of readers will turn away discouraged by their own ignorance. The book contains little of novelty nor does it claim to—it is a well planned and evidently a laboriously executed review.

The first part presents the important contribution, to theory, reviewing the methods of experimenters and attempting to determine the true accuracy of the data derived. The author shows by example, how he would apply the data, now available, in the design of a flyer. A second part takes up the description of those machines which we have heard most of, dividing them for convenience into the great classes of monoplane and biplane. Part III. of the book comes the nearest to marked originality in its very interesting comparisons of the characteristic features and performances of the several machines described.

The book is well illustrated and some of the pictures seem to be new. It is worth noting that the book is based on a master's thesis presented in the department of physics of Columbia University.

COURS DE MECANIQUE (Vol. II., Mécanique Spéciale des Fluides; Hydraulique, Thermodynamique, Air Comprimé).—By L. Guillot, Professor de Mécanique a l'Ecole Nationale d'Arts et Métiers d'Angers. Paris: Ch. Beranger, 15 Rue des Saint-Péres. Cloth; 6 x 8¾ ins.; pp. 346; 202 cuts in the text. Price, 10 francs ($3).

This is a treatise on the theories and principles of hydrostatics and hydrodynamics. It is largely mathematical in character, and its illustrations are mainly diagrams or diagrammatic representations of machines. The opening chapter, on the general principles of the mechanics of fluids, is followed by one on the flow of water through orifices, through closed pipes and open channels, and over dams. Hydraulic machines are dealt with in five chapters; these include water wheels, turbines, water-jet wheels, pumps (reciprocating, centrifugal and rotary), hydraulic rams, accumulators. A short chapter deals also with hydraulic motors, including accumulators, cranes, and engines of the type used in operating capstans and dock machinery. Two chapters are devoted to compressed air and the principles of air compression; these include also the uses of this form of power, as in rock drills, pneumatic hammers and riveters. Finally, a chapter is devoted to ventilation by fans and jets. The book is well printed and well illustrated. There is no index, but there is a table of contents covering three pages.

DROP FORGING, DIE SINKING AND MACHINE FORMING OF STEEL.—Modern Shop Practice, Processes, Methods, Machines, Tools and Details. By Joseph V. Woodworth, Author of "Dies: Their Construction and Use," etc. New York: The Norman W. Henley Publishing Co. Cloth; 6 x 9¼ ins.; pp. 341; 304 illustrations in text. $2.50, net.

An immense amount of miscellaneous information on drop-forging, tools and methods is given in this volume. Its chief fault is the lack of systematic arrangement or classification of the subject matter, which makes it a rather bewildering book to read straight through. A good index makes amends to some extent for this fault. The preface states that this volume is largely made up of material taken from the columns of the "American Machinist" and "Machinery," which probably accounts for the rambling way in which the book jumps from one phase of the subject to another and back again. The author's style is clear and direct.

MASCHINENTECHNISCHES LEXIKON.—Herausgegeben by Ing. Felix Kagerer. Wien: R. v. Waldheim, Jos. Eberle & Co. Paper; 6¾ x 10½ ins.; pp. 48; many text illustrations. Heller 80, Pfennigs 70; American price, 95 cts.

Something more than a dictionary, but considerably less than an encyclopedia, this "lexicon" aims to cover the field of mechanical engineering, in fact almost all of engineering. Judging by this first part (there are to be 30 parts in all), the definitions are stated very briefly as a rule, but the text is helped out by an ample number of illustrations. The equivalents in foreign languages are not given.

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London: CHAPMAN & HALL, Limited. Montreal, Canada: RENOUF PUBLISHING CO.

AN INTRODUCTION TO THERMODYNAMICS.—For Engineering Students. By John Mills, Professor of Physics and Electrical Engineering, Colorado College. Boston, New York, Chicago, London: Ginn & Co. Cloth; 6 × 9½ ins.; pp. 136; 64 text figures; three tables. $2. net.

Mr. Mills has joined the ranks of the ever-increasing company of teachers who feel unable to teach as successfully with present text aides as those they place in the hands of their students certain notes which they have specially arranged. One of the subjects in the presentation of which most teachers particularly seem to dislike the notes arranged by other teachers is thermodynamics, for each one has particular idiosyncrasies as to what is essential and what is of only minor importance. Prof. Mills approach to thermodynamics is not quite of the cut-and-dried form with which we are familiar; this is noticeable, for instance, in the discussions of reversible and irreversible processes and of entropy. In the latter case it is worth noting that there is an attempt to lead the student to some more definite mental conception of this elusive quality by developing the idea of heat rejected instead of passing it by as a mere handy mathematical expression or height on a diagram whose length is temperature. It should be noted that the book seems especially condensed and arranged for class-and-teacher methods of instruction and hardly for collateral reading by students or self-instruction even by advanced readers.

PRINCIPLES OF PHYSICS.—Designed for Use as a Textbook of General Physics. By William Francis Magie, Ph. D., Henry Professor of Physics in Princeton University. New York: The Century Co. Cloth; 5½ × 8¾ ins.; pp. 570; 281 text figures. $2.50, net.

Professor Magie's new physics text has a refreshing and interesting character, due to his reverting to the historical order of presentation. This method has been abandoned rather generally, and in many instances the effect is not good. For example, a thorough appreciation of what the principles of mechanics really mean can hardly be obtained until the historical development of the subject is learned. Similarly in various parts of what is more properly physics, as well as in chemistry (though the latter is not in question here).

It seems that the author's chief reason for using the historical method was to impress the student with a continuous series of examples of inductive thinking. He rightly argues that in much of the current physics teaching this important element of the study is left by the wayside. The effort to give it proper consideration seems to have succeeded commendably in the book before us. On this account engineers may be particularly advised to read the section on mechanics. In a few places the effort is less effective; for instance, Avogadro's hypothesis, probably one of the hardest to comprehend of scientific generalizations, is not made much more plausible here than in other text-books. But this is an individual criticism. The book is good, as good for home study and review as for school use.

FOREST POLICY.—By C. A. Schenck, Ph. D., Director Biltmore Forest School; Late Forester to the Biltmore Estate and Oberfoerster in Hesse-Darmstadt. Second edition, revised and enlarged. Asheville, N. C.: Biltmore Forest School. Paper; 5¾ × 8¾ ins.; pp. 168. $1.75, net.

These notes on forest policy are intended primarily for students attending the Biltmore Forest School, at Asheville, N. C. The notes form a portion of a treatise which the author describes as an "encyclopedic textbook of forestry" written by him in the past dozen years on behalf of the school mentioned. The author takes up the "Characteristic Features of Forestry," "Useful Functions of the Forest," and "Statistics." Political history and governmental measures relating to forestry investments and the relation of the forest to health, temperature, precipitations, evaporation, runoff, etc., are briefly discussed.

OUR INLAND SEAS.—Their Shipping and Commerce for Three Centuries. By James Cooke Mills. Chicago, Ill.: A. C. McClurg & Co. Cloth; 5⅛ × 8½ ins.; pp. 380; numerous photographic illustrations in text. $1.75, net.

Any history of the lands bordering on the Great Lakes or of the commercial development of these waterways, if it is at all complete must be a peculiar combination of mere narrative and technical description involving geology, ship construction, railroad and general economic statistics. The author has endeavored evidently to make his work complete, for all these features are seen. Unfortunately, he is not as strong in geology, mechanical engineering and economics as in fine writing, and the book is more apt to be treasured for its imaginative descriptions of what is supposed to have taken place in the dim past than as a storehouse of accurate data for the engineer or statistician.

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FROST DATA OF THE UNITED STATES AND LENGTH OF THE CROP-GROWING SEASON AS DETERMINED FROM THE AVERAGE THE LATEST AND EARLIEST DATES OF KILLING FROST.—By P. C. Day, Chief of Climatological Division. Prepared under the direction of [illegible] Moore, Chief of Weather Bureau. Bulletin No. V. U. S. Department of Agriculture, Weather Bureau. Washington, D. C.: Pub. Doc. Paper; [illegible] ins.; pp. 5; five folding charts.

HIGHWAY IMPROVEMENT.—Construction and Maintenance of Earth, Sand-Clay and Oiled Earth Roads, and Culverts. By W. S. Gearhart, Highway Engineer, Kansas Agricultural College. Manhattan, Kan.: Extension Department, Kansas State Agricultural College. Paper; 6 × 9 ins.; illustrated.

DIE KAISERBRUECKE IN BRESLAU.—By [illegible]-Ing. Trauer, Stadtbauinspektor in Breslau. Leipzig: Wilhelm Engelmann. Paper; 8½ × 11¼ ins.; [illegible] text figures. Marks 2; American price, 50 cts. net.

LES LOIS EXPERIMENTALES DE L'AVIATION.—By M. Alexandre Sée, Ancien Elève de l'Ecole Polytechnique. Paris: Librairie Aéronautique, 46 Rue de Seine. Paper; 6½ × 10 ins.; pp. 348; 149 text figures. Francs 7.50; American price, $2.25, net.

MAGNETIC PROPERTIES OF HEUSLER ALLOYS.—By Edward B. Stephenson. Bulletin No. 47, University of Illinois, Engineering Experiment Station. Urbana, Ill.: The University. Paper; 6 × 9 ins.; pp. 38; 28 text figures and 4 tables.

THE MANUAL OF STATISTICS.—Stock Exchange Handbook, 1911. Railroad Securities, Industrial Securities, Government Securities, Stock Exchange Quotations, Mining, Grain and Provisions, Cotton, Money, Bank and Trust Companies. New York: The Manual of Statistics Co. Cloth; 5½ × 8 ins.; pp. 1092; 16 maps. $5, net.

METHODS OF INVESTIGATION OF TIDES AND CURRENTS.—A Review of the General Methods Adopted in a New Field of Investigation, by the Tidal Survey of Canada. By W. Bell Dawson, M. A., D. Sc., M. Inst. C. E., F. R. S. C. Reprinted from the "Transactions" of the Royal Society of Canada, Third Series—1910. Ottawa: The Royal Society of Canada. Paper; 6½ × 9 ins.; pp. 17.

LA NAVIGATION SOUS-MARINE.—By Charles Rudiguer, Ingénieur du Génie Maritime. Paris: Octave Doin & Sons, 8 Place de l'Odéon. Cloth; 5 × 7¼ ins.; pp. 361; 102 text figures. 5 Francs; American price, $1.50, net.

OHIO STATE BOARD OF HEALTH.—Annual Report, 1909. (C. O. Probst, M. D., Secy.) Columbus, O.: Pub. Doc. Cloth; 6½ × 9½ ins.; pp. 479; one map.

PAN AMERICAN UNION.—Proceedings of the Pan American Commercial Conference, Feb. 13-17, 1911. Washington, D. C.: John Barrett, Director General. Paper; 6 × 9 ins.; pp. 330; illustrated. 50 cts., net.

MINISTERIO DA VIACAO E OBRAS PUBLICAS. INSPECTORIA DE OBRAS CONTRA AS SECCAS.—Miguel Arrojado Lisbôa, Inspector. Rio de Janeiro, Brazil: Pub. Docs. Paper; 9¼ × 12½ ins.

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STATE OF OREGON.—Third Biennial Report of the State Engineer, John H. Lewis, to the Governor, 1909-1910. Salem, Oregon: State Doc. Cloth; 6 × 9 ins.; pp. 172; 11 plates and many text illustrations.

STORAGE RESERVOIRS AT THE HEADWATERS OF THE WISCONSIN RIVER AND THEIR RELATION TO STREAM FLOW.—Preliminary Report by C. B. Stewart, Consulting Engineer, February, 1911. Wisconsin State Board of Forestry; E. M. Griffith, State Forester. Madison, Wis.: State Doc. Paper; 6½ × 9½ ins.; pp. 30; 30 plates.

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